

REMARKS

Claims 3, 4, 6, 8, 10, 11, 12 and 22 are pending and have been examined in the present application.

Claims 3, 6 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 2,779,925 to Black in view of U.S. Patent No. 4,376,920 to Smith. Applicants respectfully traverse this rejection.

Among the limitations of independent claim 3 which are neither disclosed nor suggested in the prior art of record is a coaxial resonator which includes “a non-conducting element disposed between the columnar element and the dielectric element”, wherein “the non-conducting element is air”.

As admitted on page 3 of the Office Action, Black fails to teach or suggest the use of air as a non-conducting element. The Office Action relies on the teachings of Smith for showing that it is well known in the art to provide air between an inner and an outer conductor, and cites column 3, lines 39-47 of Smith. Contrary to the Office Action, however, Smith does not teach or suggest the use of air as a non-conducting element.

Smith specifically provides that a high dissipation factor dielectric material is placed between the spaced apart conductors. See column 3, lines 29-40. Smith further states that this dielectric material preferably has a dielectric constant above about 2.3. This is in direct contrast to having air between the conductors because it is well known that the dielectric constant of air is 1. Therefore, Smith does not even remotely suggest placing air between the two conductors. In fact, inasmuch as Smith teaches the use of a high dissipation factor dielectric material between the spaced apart conductors, it teaches away from the present invention as defined in independent claim 3.

Therefore, even if one were to combine the teachings of Black and Smith, one would not arrive at the present invention as defined in independent claim 3. At best, one would arrive at a coaxial resonator which has a high dissipation factor dielectric material, having dielectric constant above about 2.3, disposed between spaced apart conductors. Accordingly, it is respectfully submitted that independent claim 3 patentably distinguishes over the art of record.

Claims 4 and 6 depend directly from independent claim 3 and include all of the limitations found therein as well as additional limitations which, in combination with the limitations of independent claim 3, are neither disclosed nor suggested in the prior art of record. Accordingly, claims 4 and 6 are likewise patentable.

Among the limitations of independent claim 22 which are neither disclosed nor suggested in the prior art of record is a coaxial resonator wherein “the inner conductor has a multi-layer electrode structure in which conductor layers and dielectric layers are alternately laminated”, “a thickness of the conductor layers and a thickness of the dielectric layers are based on the non-conducting element”, and “the inner conductor is formed separate from the dielectric element and inserted into the hole of the dielectric element.”

Prior to the present invention, a non-conducting element between a columnar element and a dielectric element has not been taken into consideration when the thickness of the conductor layers and the thickness of the dielectric layers are determined. In fact, it has been believed by those of skill in the art that a multi-layer electrode can not have a low-loss characteristic when a non-conducting element is placed between a columnar element and dielectric element.

Black and Smith do not teach or suggest these combined limitations. While Black is directed to a composite coaxial resonator, it neither teaches nor suggests that a

non-conducting element disposed between the columnar element and the dielectric element as required by independent claim 22. In contrast, Black teaches that an intermediate dielectric member, and not a non-conducting element, is disposed between the central core 11 and the outer conductor 15. Similarly, Smith teaches that a dielectric material, and not a non-conductive material, is disposed between the spaced apart conductors. In addition, neither Black nor Smith teach or suggest the formation of the inner conductor separate from the dielectric element and its subsequent insertion into the hole of the dielectric element.

Therefore, even if one were to combine the teachings of Black and Smith, one would not arrive at the present invention as defined in independent claim 22. At best, one would arrive at a coaxial resonator having an intermediate dielectric member between the spaced apart conductors. Accordingly, it is respectfully submitted that independent claim 22 patentably distinguishes over the art of record, and reconsideration and withdrawal of this rejection is respectfully requested.

Claims 8 and 10-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,293,141 to Kobayashi et al. in view of Black and Smith. Applicants respectfully traverse this rejection.

Similar to independent claim 3, each of independent claims 8 and 10-12 require that the non-conducting element is air and is disposed between the columnar element and the dielectric element.

As described above, the combination of Black and Smith fails to teach a non-conducting element of air disposed between a columnar element and a dielectric element. In fact, inasmuch as Black and Smith specifically teach that specific dielectric materials other than air are disposed between the elements of the resonator, they teach away from the present invention as defined in independent claims 8 and 10-12.

Kobayashi et al. does not remedy any of the deficiencies of Black and/or Smith. Nowhere within Kobayashi et al. is it disclosed or suggested, to place a non-conducting element of air between a columnar element and dielectric element, let alone base the thickness of the conductor layers and the thickness of the dielectric layers on the non-conducting element as required by independent claims 8 and 10-12.

Therefore, even if one were to combine the teachings of Kobayashi et al., Black and/or Smith, one would not arrive at the present invention as defined in independent claims 8 and 10-12. At best, one would arrive at a structure that includes a coaxial resonator having a high dissipation factor dielectric material disposed between the central core and the outer conductor. Accordingly, it is respectfully submitted that independent claims 8 and 10-12 patentably distinguish over the art of record, and reconsideration and withdrawal of this rejection is respectfully requested.

Claims 3, 6, 8, 10-12 and 22 stand rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-12 of U.S. Patent No. 6,556,101 in view of Black and Smith. Applicants respectfully traverse this rejection.

As admitted on page 6 of the Office Action, claims 1-12 of U.S. Patent No. 6,556,101 do not teach or suggest a non-conducting element of air. As described above, the combination of Black and Smith also fails to teach or suggest a non-conducting element of air.

Therefore, even if one were to combine the teachings of claims 1-12 of U.S. Patent No. 6,556,101, Black and Smith, one would not arrive at the present invention as defined in claims 3, 6, 8, 10-12 and 22. At best, one would arrive at a structure that includes a coaxial resonator having a high dissipation factor dielectric material disposed between the central core and the outer conductor. Accordingly, the rejection of claims 3,

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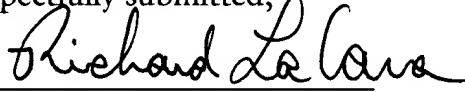
6, 8, 10-12 and 22 under the judicially created doctrine of obviousness-type double patenting must be withdrawn.

The prior art made of record and not relied upon has been carefully reviewed. It is believed that these references, either alone or combined with any other references of record, do not render the pending claims unpatentable.

In view of the foregoing, favorable consideration and allowance of the present application with claims 3, 4, 6, 8, 10-12 and 22 is respectfully and earnestly solicited.

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Respectfully submitted,

By 

Richard LaCava

Registration No.: 41,135

DICKSTEIN SHAPIRO MORIN &
OSHINSKY LLP

1177 Avenue of the Americas
41st Floor

New York, New York 10036-2714
(212) 835-1400

Attorney for Applicant